肝切除後ならびに部分肝移植後における肝ミトコンドリアの代謝動態に関する研究

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主論文 1

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Impaired polymorphonuclear leucocyte function in patients undergoing hepatectomy: adenylate energy charge and superoxide anion production in relation to hepatic mitochondrial redox state

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Patients undergoing hepatectomy have an increased susceptibility to infection. We therefore studied the energy metabolism of the polymorphonuclear leucocyte (PMN), focusing on energy charge and function, especially superoxide anion (O_2^-) generation, in relation to the hepatic mitochondrial redox state. By labelling the PMN adenine nucleotide pool with radioactive adenine and by superoxide dismutase-inhibitable reduction of ferricytochrome c, *the energy charge and O_2^- production was measured in 18 patients with hepatoma (non-cirrhotic, seven; cirrhotic, 11) undergoing hepatectomy. Their arterial ketone body ratios (KBRs), reflecting the hepatic mitochondrial redox potential, were above 0·7 before operation. After surgery, the 18 patients were divided into two groups: group A, KBR > 0·7,* n = *10; and group B, KBR < 0·7,* n = *8. The energy charge and O_2^- release in group B decreased significantly from preoperative values* ($P < 0·001$ *and* $P < 0·01$ *respectively) and when compared with group A* ($P < 0·05$ *and* $P < 0·01$ *respectively). These results suggest that impaired hepatic energy metabolism (KBR < 0·7) in hepatectomized patients leads to impaired energy charge and O_2^- production in the PMNs.*

Keywords: Leucocyte, hepatectomy, adenylate energy charge, superoxide, ketone body ratio

主論文2

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Temporary Portal Vein Arterialization as an Attractive Option in Canine Orthotopic Partial Liver Transplantation[1]

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Key Words. Ketone body ratio · Orthotopic partial liver transplantation · Portal vein arterialization

Abstract. We performed 22 canine orthotopic partial liver transplantations (PLTs) with three different revascularization methods; portal vein arterialization (PVA group, n = 11), hepatic arterial shunt (HAS group, n = 5), and conventional portal vein reperfusion (control group, n = 6). Our purpose was to evaluate the feasibility of PVA as a revascularization technique in PLT assessing the changes in arterial ketone body ratio (KBR) as an index of hepatic energy status. After the first anastomosis (left hepatic vein), the ischemic partial liver graft was revascularized with arterial blood flow shunted from the external iliac artery to the hepatic side of the portal vein (PVA group) or the proper hepatic artery (HAS group). Both anhepatic period and ischemia time were significantly shortened in groups PVA and HAS as compared with those in control. In the PVA group, 10 out of 11 recipients survived for at least 5 days (14.2 ± 3.8 days, mean ± SEM), while 3 out of 5 (5.2 ± 1.0) survived in the HAS group and 4 out of 6 (6.2 ± 1.3) in the controls. Although portal blood flow during PVA was only about 25% of the total hepatic blood flow at preclamping, the KBR was rapidly restored after PVA and showed almost the same values at preclamping. The KBR values during the arterialization time and initial velocity of KBR recovery in the PVA group were significantly higher than those in the HAS and control groups. These results suggest that PVA presents an attractive option in PLT.